Claims

1. A method for producing nanotubes and compound nanofibers with core-shell structure, from electrified coaxial jets, which consists in forcing a first liquid through a first electrified capillary tube to form a Taylor cone at the exit of the capillary tube, from whose vertex a very thin jet is issued, whose flow rate ranges between 0.1 and 10000 microliters per hour and in forcing a second liquid, immiscible or poorly miscible with the first liquid, through a second capillary tube, where this second capillary tube is located inside the first one and approximately concentric with it, in such a way that the second liquid forms an almost conical meniscus, anchored at the exit of the second capillary tube, inside of the Taylor cone formed by the first liquid, in such a way that a jet of the second liquid, whose flow rate ranges between 0.1 and 10000 microliters per hour, is issued from the vertex of the conical meniscus of the second liquid, in such a way that the jet of the second liquid flows simultaneously and inside of the extremely thin jet of the first liquid, forming an extremely thin compound jet in which both liquids flow coaxially; Wherein the second capillary tube can be at the same or different electric potential than that of the first capillary tube and the potential difference between one of the two electrodes and the grounded electrode ranges between 1V and 100 kV; Wherein the menisci and the coaxial jet can form in a dielectric atmosphere, in a bath of a dielectric liquid, or in vacuum; In such a way that the compound jet consists of an inner core formed by the second liquid and an outer layer or coating formed by the first liquid, and that the outer diameter of the jet has a diameter between 300 microns and 5 nanometers. Wherein the first liquid (that which flows on the outside) may undergo a phase change from liquid to solid, in such a way that the time needed for the phase change (solidification) of the first liquid is comparable or smaller than the residence time of the first fluid in the coaxial jet.

2. The method of claim 1, wherein the first liquid contains a polymer solution, or contains a mixture of polymers which can solidify under an appropriate excitation, wherein the solidification time of the first liquid is comparable or smaller than the residence time of the first liquid in the coaxial jet.

3. The method of claim 1, wherein the first liquid is a sol-gel formula containing precursors which are able of solidifying, wherein the solidification time of the first liquid is comparable or smaller than the residence time of the first liquid in the coaxial jet.

4. The methods of claims 2 and 3, wherein the solidification of the first liquid produces compound fibers with core-shell structure, wherein the core is formed by the second liquid.

5. The methods of the claims 1 to 4, wherein the diameter of the compound fibers ranges between 300 microns and 5 nanometers.

6. The method of claim 6, wherein the length of the compound fibers varies between one and thousand times the diameter of the compound fibers.

7. The methods of claims 1 to 6, wherein the length of the compound fibers is larger than thousand times the diameter of the compound fibers.

8. The method of claims 1 to 6, wherein the thickness of the solid wall of the compound fibers varies between 99% and 1% of the diameter of the compound fibers, preferably between 75% and 15% of the diameter of the compound fibers.

9. The solid tubes resulting from the extraction of the second liquid from the inside of the compound fibers manufactured from claims 1 to 6 and subjected to claims 7 and 8.

10. The methods of claims 2 and 3, wherein the solidification of the first liquid produces compound fibers with core-shell structure, wherein the core is formed by a second liquid which solidifies in times of the order of the solidification time of the first liquid; that is, coaxial nanofibers.

11. The methods of claims 1 to 3 and 10, wherein the diameter of the coaxial nanofibers ranges between 300 microns and 5 nanometers.

12. The method of claim 1, wherein the length of the compound fibers ranges between 1 and 1000 times their diameter.

13. The methods of claims 1 to 6, wherein the thickness of the solid wall of the compound fibers varies between 99% and 1% of the diameter of the compound fibers, preferably between 75% and 15% of the diameter of the compound fibers.